



# SANITARY MEASURES AND MALARIA EPIDEMICS OF ATHENS

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It is well known that for a good many years past, severe and widespread malarial fevers have afflicted the inhabitants of the two large districts of Athens, Pangrati and Vatrachonisi; and according to my studies since 1900 as well as the statistical information of the local doctors of the above two districts, there has for a long time been much suffering from malaria. The morbidity varied between 25 and 30 per cent., not counting the epidemic of the years 1885, 1886, etc.; but from 1901 to 1906, before putting in force the sanitary measures and during the epidemic years, it has ranged from 49·09 per cent. to 92·85 per cent.

This amazing prevalence of the epidemic has absorbed the entire attention of the League; and as soon as the League was formed, it entrusted me to explore the sources and causes of the malaria fever, and to ascertain by what means sanitary measures could be carried out for the above two districts of the city of Athens (whose inhabitants number 8,000).

The cause of the said epidemic, as I ascertained, was the Illisus river, in whose pools of stagnant and polluted waters, innumerable legions of Anopheline mosquitoes were hatching.

In these stagnant pools I observed, in 1901-1907, only one species of Anopheline, viz., *P. superpictus*, but in my research during the year 1908 I discovered a new species of Anopheline, as yet undescribed, different from, but close to *P. superpictus*; my opinion

being confirmed by Mr. Newstead, of the Liverpool School of Tropical Medicine, to whom I sent specimens for examination.

To remove the causes of the malaria, I proposed two ways: first, temporary works of sanitation to be repeated each spring, and secondly, the building of permanent works.

The second proposition was not approved for lack of sufficient funds, but temporary works were preferred, which consisted in the transformation of the branches and small tributaries of the Illisus river-bed, by filling them up, by excavation and removing rocks; so that the flowing water might be concentrated in a sloping narrow channel in such a way as to run free without an impediment.

The work done by me for the first time, in the year 1906, on account of its beginning late in the season, afforded small relief, because the Anophelines had already hatched before the work was commenced; in consequence of which the progress of malaria, as will be seen in the Table below, could not be prevented.

In the second year, 1907, the work was begun in the latter part of the month of May in Pangrati district, and a little later in a branch of the Illisus river, viz., from the Iton bridge of Vatrachonisi district up to Rizarios Seminary. The work contributed to a large extent to the reduction of the malaria, because in the Pangrati locality, where the work of sanitation began early in the season, the morbidity from malaria dropped to 2 to 3 per cent., whereas in Vatrachonisi district, where the work was commenced later in the season or in the beginning of summer, the morbidity was from 25 to 30 per cent.

In the year 1908, the third year of the sanitary measures, they were carried out on all the branches or rivulets of the Illisus river in time, i.e., before the summer season. The malaria was, as I have ascertained, greatly reduced; and as the League was informed by the local doctors, the morbidity caused by malaria fell to 1 per cent.

The sanitary measures in the above two districts, without making any use of preventives, such as quinine, etc., have proved of great value in suppressing malaria.

Confirmation of the splendid results in suppressing malaria of the above sanitary measures is plainly afforded, not only by the examination of the sick rate among little children, but by the examination of their spleens.

COMPARATIVE TABLE OF THE SICKNESS CAUSED BY MALARIA  
AMONG THE CHILDREN IN THE DISTRICTS OF  
PANGRATI AND VATRACHONISI.

*Before the Sanitary Measures.*

Number of Children	Summer	Infected	Sick rate
* 280 .....	1901 .....	260 .....	92·85%
200 .....	1902 .....	160 .....	80%
235 .....	1903 .....	192 .....	87·70%
180 .....	1904 .....	89 .....	49·09%
200 .....	1905 .....	185 .....	92·50%
<hr/> <u>1095</u>		<hr/> <u>886</u>	<hr/> <u>80·90%</u>

*After the Sanitary Measures.*

Number of Children	Summer	Infected	Sick rate
† 301 .....	1906 .....	177 .....	58·80%
‡ 345 .....	1907 .....	73 .....	21·15%
§ 300 .....	1908 .....	8 .....	2·66%
<hr/> <u>946</u>		<hr/> <u>258</u>	<hr/> <u>27·27%</u>

*Examination of the spleen of the above children in 1907.*

Of 186 children examined in April, 1907, 29, or 15·59 per cent., had enlarged spleen.

Of 345 children examined in November, 1907, 10, or 2·89 per cent. had enlarged spleen.

*Examination of the spleen of the same children in 1908.*

Of 290 children examined in April, 1908, 6, or 2 per cent., had enlarged spleen.

Of 300 children examined in November, 1908, none had enlarged spleen.

\* The statistics from 1901-1904 were made in collaboration with Professor Pezapoulos.

† The measures were taken late in the season.

‡ The measures were taken in time.

§ The measures were taken in time.